REMARKS

The present response is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Claims 1-47 are pending in this case. Claims 12-15 have been withdrawn from consideration. Claims 23-33, 39-47 have been allowed. Claims 1-11, 37 have been rejected under 35 U.S.C. § 112, second paragraph. Claims 16-22, 34-38 have been rejected under 35 U.S.C. § 103(a). Independent claims 1, 16, and 34 and dependent claims 21 and 37 have been amended.

Telephonic Interview

Applicant wishes to thank the Examiner for granting a personal interview on December 6, 2004. The interview participants included Examiner Saba Tsegaye and Howard Zaretsky (Applicant's representative).

Response to 35 U.S.C. § 112, Second Paragraph Rejections

The Examiner rejected claims 1-11, 37 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Regarding claims 1 and 37 Applicant has amended these claims to clarify the "synchronization signals" limitation.

Amended claims 1 and 37 now feature language which make it clear what the subject matter is that the Applicant regards as the invention. Applicant believes that amended claims 1-11, 37 overcome the Examiner's rejection based on § 112, second paragraph grounds. The Examiner is respectfully requested to withdraw the § 112, second paragraph rejection.

Response to 35 U.S.C. § 103(a) Rejections

The Examiner rejected claims 16-22, 34-38 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,974,056 ("Wilson") in view of U.S. Patent No. 6,667,284 ("Yonge") and further in view of U.S. Patent No. 5,987,024 ("Duch"). Applicants respectfully submit that the prior art fails to disclose or suggest at least the step of randomly transmitting, on a frame by frame basis, synchronization signals onto the media within a synchronization time

slot of a frame. Therefore, Applicants respectfully traverse the rejections and request favorable reconsideration.

Wilson teaches a method and apparatus for transmission of data for voice, signaling data, air traffic control facilities, telephone equipment, communication systems, etc., wherein the data is transmitted in the form of data packets comprising a preamble, header, data and/or signal bytes via a dual bus between decentralized stations connected to the bus, wherein the stations receive the data for transmission from connected peripheral devices and the stations transmit received data via these peripheral units, and wherein the station clock pulse is synchronized by a synchronizing signal transmitted from a master station.

The method of Wilson is operative to select a master station from among all the stations before the transmission of data. Once a master station is selected, the individual stations (not the master) are synchronized with a fixed phase relationship using start packets transmitted at the beginning of a frame which represent synchronization signals which apply to all stations. With each transmission of at the beginning of each frame, individual stations are synchronized anew with a fixed phase relationship. Each synchronized station is assigned a time slot within the frame during which the station can send data to the bus. Thus, the scheme of Wilson is a centralized synchronization scheme in which a single station, chosen from among all the stations, acts a master station wherein the start packet transmitted by the mast station is used by individual stations to derive their timing.

In contrast, the method of the present invention is a **decentralized, distributed** synchronization scheme where there is no master station. All nodes in the network of the present invention are peers and all are operative to transmit and listen to synchronization signals. Rather than use a centralized synchronization scheme as in Wilson, the nodes in a shared media network of the present invention align their internal clocks using a distributed synchronization scheme. Each node in the network is adapted to randomly transmit, on a frame by frame basis, a synchronization signal within a synchronization time slot within the frame. During times that a node does not transmit this signal, it listens to the media for the signals of other nodes. The node then adjusts its internal clock based on the signals received from other nodes. This feature is neither taught nor suggested by the Wilson, Yonge or Duch references.

Yonge teaches a MAC scheme for network stations operating in an OFDM transmission network. The MAC scheme uses robustly transmitted frame control information to ensure network synchronization and convey channel access prioritization for QoS. Frame control information can occur in a frame before and after the frame's payload, or in a response. Yonge teaches a distributed MAC scheme wherein the transmitting station senses the transmission medium via a carrier sense mechanism to determine if other stations are transmitting. Yonge teaches both physical carrier sense and virtual carrier sense. Physical carrier sense is provided by the PHY through the detection of the Preamble and tracking of OFDM symbols through the packet body. The virtual carrier sense mechanism uses a timer and a flag to track the expected duration of channel occupancy based on information represented in the frame control fields.

It is submitted that the physical or virtual carrier sense mechanism of Yonge is significantly different than the frame occupation signal and time slot of the present invention. In the mechanism of the present invention, the frame occupation signal is transmitted during a "media busy" time slot or portion of the frame. The frame occupation signal is generated and transmitted simultaneously by one or more nodes and is used to indicate to all nodes that hear it that the next frame is occupied. Thus, the frame occupation signal time slot is used to convey information about the next frame in the future to all other nodes. This feature is neither taught nor suggested by the Wilson, Yonge or Duch references.

Duch teaches a self synchronizing network protocol which allows networks to become self synchronizing. The problem Duch was intended to resolve is that in an ad hoc network employing a channel access scheme similar to Reservation ALOHA (i.e., time division multiple access-like with contention), it is difficult to ensure that all nodes are slot synchronized. After a node obtains a position in the frame and continues to transmit periodically, it is possible that another packet will start to overlap its allotted time due to inaccurate clocks at each node. This effect does not occur in slotted systems since the packets are confined to a single slot but will occur in ad hoc networks. The scheme of Duch teaches a method which alleviates this problem of packet overlap created by inaccuracies of the clocks at each node in ad hoc networks.

In the scheme of Duch, two pairs of nodes communicate in an ad hoc packet radio network. Packets are communicated over a plurality of frames of time. A known bit field is appended to each packet which is used to detect errors when overlap with another node occurs

due to clock drift. Consider a clock at a first pair of nodes is unavoidably slower than the clock at the second pair of nodes. As a result, packets transmitted from the second pair of nodes will eventually overlap packets transmitted from the first pair of nodes. Errors in the appended field can be used to detect such an overlap in advance to prevent damage to the payload. Thus, the scheme of Duch use bit errors in a field of known data appended to each frame to detect the overlap of two frames. Thus the scheme of Duch only learns about the proximity of the timing of two nodes **after** an overlap of the two frames occurs via the detection of errors in the appended field. Absent any errors, no corrective action is taken. This appended field thus is "sacrificed" to protect the real payload data within the frame.

In direct contrast, the scheme of the present invention learns about collisions in a significantly different manner. Nodes transmit synchronization signals at a predetermined point within in each frame, notably during the synchronization slot at the beginning of each frame. Preferably, the synchronization signal and the frame occupation signal comprise wide band signals with collision resistant signal characteristics. This permits at least one of the nodes to detect the transmitted signal in the event several nodes transmit the same signal at the same time thus preventing the transmissions from canceling each other. Note that it is not necessary to determine the source of the transmission, only whether a signal was detected.

Note that in the scheme of the present invention, once synchronization is achieved among several nodes within a group, all nodes within the group that decide to transmit synchronization signals will transmit them at the **same time** more or less within the synchronization time slot. This is necessary to insure that all nodes within the group have their clocks synchronized thus enabling accurate communications over the shared network. Once synchronized, nodes can monitor the frame occupation field to find a free frame in which to transmit. This feature is neither taught nor suggested by the Wilson, Yonge or Duch references.

This is in contrast to the very different scheme of Duch in which the goal is to **prevent** any overlap of packets as determined by the **absence** of any bit errors in the field appended to each frame. Since any bit errors detected means that packets are beginning to collide.

Regarding claims 16-22, 34-38, it is submitted that the combination of Wilson, Yonge and Duch would not result in the claimed invention. The Examiner has improperly combined Wilson, Yonge and Duch in an attempt to arrive at the claimed invention. The combination

suggested by the Examiner fails to teach or suggest all the claims limitations. In particular, neither Wilson, Yonge nor Duch alone or in combination teach or suggest the steps of randomly transmitting, on a frame by frame basis, synchronization signals onto the media within a synchronization time slot of a frame; and once synchronization is achieved, maintaining the media in a busy state by transmitting a frame occupation signal within a "media busy" time slot within each frame. Therefore, Applicant respectfully traverses the rejection of claims 16-22, 34-38 and submit that the presently claimed invention in patently distinct over Wilson in view of Yonge and further in view of Duch. The Examiner is respectfully requested to withdraw the rejection based on 35 U.S.C. §103(a).

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that independent claims 1, 16, 23, 34 and 39 and hence dependent claims 2-11, 17-22, 24-33, 35-38, 40-47 are now in condition for allowance. Prompt notice of allowance is respectfully solicited.

In light of the Amendments and the arguments set forth above, Applicants earnestly believe that they are entitled to a letters patent, and respectively solicit the Examiner to expedite prosecution of this patent applications to issuance. Should the Examiner have any questions, the Examiner is encouraged to telephone the undersigned.

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Respectfully submitted,

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